Safety & Loss Prevention Subject Group

S&LPSG

IChemE

Newsletter

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EDITORIAL

The meeting of the Hazards Forum on the 19th May on Sharing Accident Information is reported fully www.hazardsforum.co.uk
Go to tab for Books & Publications. This meeting showed a quite different culture between the petrochemical industry and the aircraft industry. Unfortunately the chemical industry was not present.

HAZARD FORUM NEWSLETTER

Issue 47 contains:

The Report of the Executive Meeting
Risk Engineering: is it such a Bad Thing
Second International Conference on Post-disaster Reconstruction: Planning for Reconstruction
Report on the Meeting on Learning from Accidents - Sharing Information and Experience
Costing the Impacts of Climate Change in the UK

The Hazards Forum Newsletter can be viewed on www.hazardsforum.co.uk

MARTIN GOOSE INTERVIEWS CHRIS WILLBY OF HAZARDOUS INSTALLATIONS DIRECTORATE.

Q1. With regards to safety and loss prevention, in what areas (e.g. improved design, safety management systems) have you seen the greatest

improvements in the last 5 years, and which are the areas which require more attention?

A1. We have seen great improvements in the design aspects of both new plant and engineered modifications over the past twenty years. However the occurrence of incidents in which the participation of humans, by omission or commission, has been an initiating or significant contributory factor remains stubbornly high.

We have seen increasing recognition of this over the past five years with more attention paid to both safety management systems and the development of programmes to improve safety culture through

programmes of staff involvement in safety and safety leadership. This will continue. If I had to identify an additional area where I believe we could improve, it would be maintenance. I still see too many examples of plants designed to be functional, and safe in operation but which I believe could have made better provision for easy, safe maintenance.

Q2. What role could HID have in identifying and promoting best practice and sharing of lessons from accidents?

A2. In order to improve safety, which increasingly is accepted as also improving the business, we need to learn from each other. This means being prepared to exchange information and being prepared to consider whether "it could happen here". Our role, as a Directorate of HSE is to encourage and facilitate this process. I see there being two main requirements, the need for databases in which incidents are logged with a simple description of what went wrong and secondly sharing the detailed professional and technical assessment of what went wrong, what were the root causes and how it was rectified. In each case both Trade Associations and Professional Institutions have a part to play. In HID we are currently working with the Chemical Industries Association and UK Petroleum Industries Association to pilot a voluntary anonymised database for incidents which are well below normal statutory reporting requirements but which will, in time, increase our knowledge of precursor incidents. We also publish the results of our major inquiries, for example our report on BP Grangemouth in 1993, and encourage professional staff to share their own analysis of events with their peers through professional institutions and the technical press. This responsibility to share their experience should be in the mind of every member of a professional institution.

Q3. How do you see HSE inspectors interacting with COMAH operators in a more informal way in order to improve trust, increase dialogue and exchange "real" best practice?

A3. I would like to think that our inspectors already operate in an informal way for most of their interactions with COMAH, or any other operators. There are occasions particularly during investigations or when taking enforcement proceedings that a degree of formality must be introduced but for most of the time I expect inspectors to operate in an informal partnership giving advice and guidance and working with operators to maintain or, where they reasonably can, improve safety.

Q4. What plans does HID have to improve consistency of regulation across the UK?

A4. One recent development, which I hope we can build upon is to hold workshops on particular topics on neutral ground with representatives from industry where no one feels under scrutiny and all are there to share experience and work together. It is only by working together, respecting each others views that trust can develop.

For any organisation operating on a number of, or on different sites, consistency is a potential problem, for example, we have far too many examples of inconsistency in industry between sites of the same company. Within HID our inspectors have guidance, which is publicly available, and all our inspectors undergo similar training. What we have had in the relatively recent past is a rather high turn over of staff, with the loss of some experienced inspectors. I believe that this period is now largely behind us, the field force is becoming more experienced and will I am sure demonstrate consistency.

Q5. There is a no blame culture within the aircraft industry that is recognised internationally. Would a similar approach for the petrochemical sector facilitate the sharing of accident information and give rise to a reduced accident record?

A5. I believe in no blame cultures as they are a sign of a healthy safety culture and assist in sharing experience. I would hope that site operators see the benefits of building no blame reporting into their own systems. I referred earlier to an anonymised data collection pilot we are running. Where the difficulty in formal no blame reporting can arise is that, particularly for serious breaches, HSE also has to enforce the law. As an individual has duties under health and safety law (Sections 7 and 8 of the

HSW Act) it is not possible for HSE to guarantee that no individual will be the subject of proceedings. However we take action against employees of companies on an infrequent basis. Most incidents arise from failures by companies rather than individuals. Other regulatory regimes, ie Air Transport operate under different laws.

Q6. Is there a role for increased self verification in the chemical sector leading to a reduced need for inspection by HSE?

A6. Self verification systems are an essential part of any management of safety system, indeed it is difficult to see how they can be successfully operated without feedback from monitoring and self verification. HSE already bases its inspection programmes upon risk and the record of the operating company. As part of the Competent Authority there are statutory requirements for COMAH verification which we must satisfy but a company operating safely, demonstrating through its own self verification systems that it is managing the risks of both process and occupational health and safety will be able to better satisfy inspectors and in turn will receive less attention than one which is not. HID have again recently piloted work in the offshore sector on station keeping of floating production storage and offtake (FPSO) installation where the operators have carried out audits and we are tracking the completion of audit recommendations rather than repeat work carried out in the audits ourselves.

Q7. What do you see as the implications of the reduction in safety and loss prevention expertise in industry and HSE (due to the 2010 Strategy move to emphasise health) and the increasing use of consultants/contractors by both?

A7. In all the engineering and scientific professions we need to work hard to ensure that we capture some of the brightest young people available if we are to sustain current expertise and this presents a constant substantial challenge. Contractorisation or the use of consultants can bring substantial benefits provided the employing company has the necessary expertise to act not only as intelligent customer, but also to participate where necessary. We have seen some excellent COMAH reports produced by companies who have integrated contractors into the in-house teams producing them. At the other end of the scale the employment of contractors to produce a report with minimal involvement of in-house staff appears neither to add to safety nor buy commitment from staff to use the results to improve areas of identified weakness. I believe a strong contracting/consulting sector is vital in supporting a safe, competitive, sustainable industry, but it must be used correctly.

STATIC HAZARDS MEETING - SYNGENTA, HUDDERSFIELD, 22ND JUNE

This one day Safety and Loss Prevention Subject Group meeting attracted 30 delegates. Graham Ackroyd of Syngenta, standing in for Norbert Gibson, provided an excellent start to the day by describing the various types of discharge that could give rise to ignitions. By examining the relationship between energy release and capacitance it can be clearly shown that the perception that a spark has to be apparent before ignition can occur, either visibility or though the reaction of the human body, is far from reality. The greatest potential for energetic discharge comes from insulated conductors, even to the extent that a person who is not earthed can generate 10 times the minimum ignition energy for most hydrocarbon gases. Static charging on insulating materials is influenced by resistivity and surface smoothness; lower resistivity and rougher materials disperse charges more rapidly. Relevant codes and standards are:

- CENELEC PD CLC/TR 50404:2003 is the Europe code of practice for the avoidance of static hazards.
- BS 5958 Part 1 and 2 are the UK standards that cover control of undesirable static electricity hazards but are weak on FIBC's (flexible intermediate bulk containers).
- IEC 61340-4-4 & IEC 61340-4-6 (currently in draft) cover the classification and testing of FIBC's.
- NFPA 77 (2000) is the US recommended practice on static electricity

With the basics having been covered the meeting went on to examine a wide range of incidents that

have been attributed to static discharge. Graham Tyers, of Newson Gale Ltd., reported that there are on average 50 significant incidents per year in the UK attributed to static discharge. Across Europe, the number is about 350 per year, and there is anecdotal evidence from the USA that the number there is of the same order. As these numbers relate to those incidents where the intervention of outside emergency services is required, there are clearly a lot more that go unreported across the industry.

Under UK explosion protection ATEX Regulations, there is a requirement to understand and include static hazards in a site Explosion Protection Document required by law. Graham described two areas where static hazards are common. The first of these is road tankers, where a properly deigned and tested earthing system can be rendered ineffective by connecting an earthing clip to painted surfaces. Another example is the refitting of a fixed earth connection on the tanker shell after repainting. The second was in the filling of barrels and drums where good design can be invalidated by inappropriate operator activity and changes to equipment made by those unaware of static hazards. Operator training and maintaining robust management of change is vital to prevent hazards being created. Examples given were: changing of the plastic wheels on a set of industrial scales - the original conductive ones became damaged by solvent, so were replaced with a solvent resistant type which happened to be good insulators. In other examples: operators filled plastic drums with waste solvent when they ran out of steel drums, and painting of a conductive floor for cosmetic reasons rendered it non-conductive.

Mark Hoyle from AstraZeneca described a scenario involving an inerted vessel that resulted in damage to glass lined vessel internals by static discharge, due to the agitation of insulating solids in an insulating solvent. Similarly, product contamination through partial combustion occurred when the inert gas blanketing temporarily failed in a mixing vessel. On plant that is constructed from a mix of conductive and non-conductive components, it is easy to miss the earthing of small conductive elements such as clamps and flanges. Operator training is critical to creating an understanding of how charges are created and dispersed. Simple activities, such as vacuum cleaning, and protection of conductive surfaces using insulating tape can give rise to incendive discharge. Misplaced initiatives, such as the use of a non-conductive plastic stool to support a smaller than normal keg in a filling machine can create a hazard where one did not previously exist. Robust management of change in the very simplest of cases is vital to maintaining a safe plant.

After lunch, Graham Astbury of Avecia discussed management of change issues arising from the replacement of an established process using hot solvent with a slow mixer in an open vat, with one using cooler solvent with a fast mixer in a closed vat in order to reduce solvent emissions. The old process had been used successfully for many years, but immediately on starting up the modified system ignition occurred within the closed vat. The mixer was immediately blamed. It was removed and inspected but, apart from noisy bearings, no ignition potential was found. The process was restarted and again ignition occurred. This time the investigation went deeper. It was found that there was no written Basis for Safety for the process in either its original or modified form. While there was no doubt that static was generated through the mixing process, reducing the process temperature had moved it into the flammable regime of the solvent. Lessons learned included the need to build a robust Basis for Safety founded on proper information to establish a safe operating envelope. Unless all relevant information is assembled, an investigation will invariably fail. There is a need for wide general knowledge within the process community to allow individuals to be able to recognise their own limitations and the need to seek expert advice as appropriate. "You don't know what you don't know" is very appropriate here.

Graham Ackroyd gave the last presentation of the day by describing the use of RIBC's (rigid intermediate bulk containers) for the removal of an interphase material from a toluene/aqueous phase separator. The main process had been assessed for static hazards. The removal of the interphase, however, was described as a "permanent abnormal" operation, and had not been assessed. An RIBC made from HDPE, a good insulator, surrounded by a metal cage was used to collect the interphase, which was drained by gravity from the separator through a braided stainless steel hose. After a

previous draining, the RIBC had been left for 12 hours. When the operator came to carry out the next draining, he removed the metal blank from the hose and placed it and the spanner on the top of the RIBC. As he introduced the end of the hose into the RIBC ignition occurred at the RIBC opening. In the investigation it was concluded that the RIBC frame was sufficiently earthed by sitting on a concrete floor, and any charge in the contents had relaxed after 12 hours. The operator had been wearing conductive footwear, but was wearing an acid suit. It was shown that the RIBC body became rapidly charged through contact with the acid suit material as he removed the flange. The blank flange and spanner, placed on highly insulating HDPE became highly charged and most likely discharged to the RIBC cage. The main technical lessons from this incident were the need to ensure that all conductive components are properly earthed, even blank flanges after removal, and not to use non-conductive IBC's for flammable materials. Toluene vapour exists as a stoichiometric mixture at normal ambient conditions, so it is fortunate the flame front did not enter the RIBC. Aspects of management control included the need to ensure that all operations are properly assessed - it was inappropriate to consider the removal of interphase as "abnormal" as it happened twice a day and should be assessed in the same way as any temporary change - and to ensure that competent people carry out these assessments.

The day rounded off with a short Q&A session discussion centred on on:

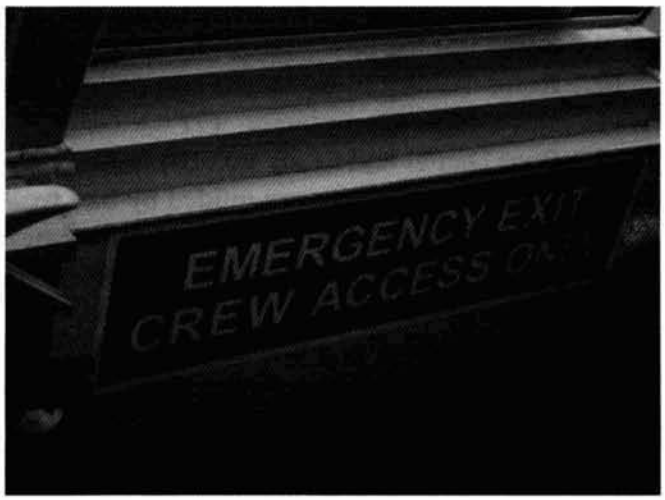
- Maintaining conductive properties of anti-static footwear. Early types had been shown to lose their conductive properties very soon after issue. Modern types are far better in retaining conductive properties, but can suffer from contamination and accumulation of dirt. There is a concern over the anti-static quality of footwear that may be used by contractors. Footwear testers are readily available and should be considered in contactor control measures.
- Conductive RIBC's - some manufacturers are using carbon-loaded plastic to improve conductivity.
- There is no international protection standard for IBC's. Work is being carried out by the UK H&SE Laboratory at Buxton, which will be published in a paper to be presented at Hazards XVIII at UMIST in November 2004.
- Electrostatic standards for PPE are in preparation. The criteria will be for electrical resistance to earth of $< 10^8$ ohms.
- Static properties of materials are not typically included in Material Safety Data Sheets.

John Atherton
29 June 2004.

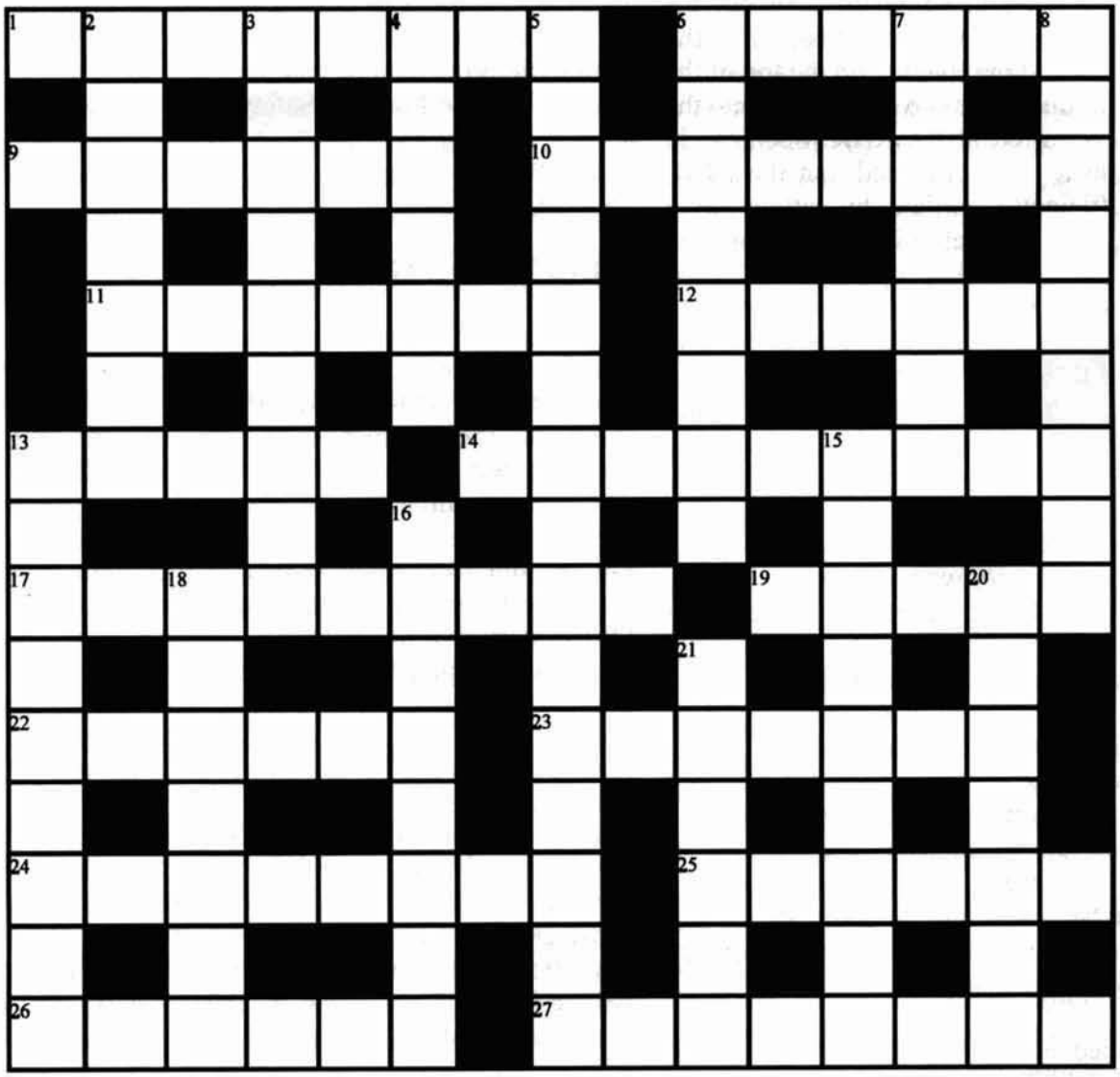
WIND LOADING

At Greenwich Observatory there is a Time Ball which falls down a vertical shaft precisely at 1.00 pm each day. This was installed in 1833 to give mariners the correct time for setting their chronometers before starting off on their journeys. This was essential for calculating their longitude position.
On the 6th December 1855 a winter gale blew down the Time Ball from the roof of the Greenwich Observatory into the courtyard. Hubert Airey, son of the Astronomer Royal Sir George Biddell Airey painted a watercolour picture to record the incident. The original Time Ball was covered in leather but this was replaced in 1919 by the present aluminium one.
Was this a portent that Sir George Airey should have noted before declaring that the design air pressure loading on the Tay Bridge would be satisfactory at 10 lbs per square foot? In 1879 the Tay Bridge blew down. Fortunately the Tower Bridge in London, opened in 1894, was designed for a loading of 56 lbs per square foot.

STRANGE NOTICES
Is it really meant only for the crew of a boat?



CROSSWORD PUZZLE No.16



ACROSS

1. About to look for activity in the laboratory. (8)
6. Drive forward like the pencil without a fish. (6)
9. Some use the new gaseous hydrocarbon. (6)
10. Refused entry to husband's coronation, the Queen turned to a chemical. (8)
11. Not a common ointment. (7)
12. Poor Daniel had to say no. (6)
13. Sounds as if horses are guided by bad weather. (5)
14. Head nurse holds some garbled information about an electron tube. (9)
17. Randomly employ aid in the production of synthetic fibres. (9)
19. Informal doctor. (5)
22. Direct descent in a line aligned. (6)
23. Units currently named after Frenchman. (7)
24. Stretchy stuff from polyurethane. (8)
25. In a reckless but spotty fashion. (6)
26. Sea nymph with submarine valve. (6)
27. Submissive yet productive. (8)

DOWN

2. The next rude joke contains reference to an industrial process. (7)
3. Come out before a hundred in U.S. city create a sudden danger. (9)
4. Pot smoking jacket? (6)
5. At the end, a flashy sort of executive. (6, 3, 6)
6. Solvent from funeral pile consuming one racket. (8)
7. P.M. first in importance. (7)
8. Young Leonard in charge after floor covering becomes acidified. (9)
13. Repulsive social outcast returns before fasting. (9)
15. Speculated that the other side had been reformed. (9)
16. Mercury and other metals make dental combinations. (8)
18. Girl and a noble gas are lethal to insects. (7)
20. Banting's polypeptide hormone. (7)
21. For example, knocks in reverse can disperse gas in the liquid. (6)

Answers to Crossword Puzzle No.15

Across

1. Non-sparking tools
9. Catalysis
10. Anion
11. Emetic
12. Scandium
13. Castor
15. Friction
18. A bee line
19. Enigma
21. Rim fires
23. Panama
26. Beret
27. Stability
28. Copper acetylide

Down

1. Nucleic
2. Nitre
3. Palmitoyl
4. Rust
5. Insecure
6. Grain
7. Oxidising
8. Lineman
14. Steam trap
16. Concavity
17. Undersea
18. Aerobic
20. Analyse
22. Ixtle
24. Alibi
25. Safe

DIARY OF SAFETY EVENTS

GROUP	TITLE OF MEETING	PLACE AND CONTACT	DATE
Institution of Mechanical Engineers	Human Error in the Workplace	IMechE, Birdcage Walk, LondonSW1 Georgina Shaw, IMechE Tel: 020-7973-1291 E-mail georginas@imeche.org.uk	8 October 2004
Institution of Mechanical Engineers	An Engineer in Court	Tim Churcher, IMechE Tel: 020-7973-1258 E-mail: t_churcher@imeche.org.uk	12 October 2004
NW Branch	HAZARDS XVIII Sharing Best Practice	UMIST Contact Mike Adams 01539-732845 mikeadams@rawgreen.fsworld.co.uk	23 – 25 November 2004
S&LPSG and the London Branch	Safety in Design – the necessary tools for the design engineer.		TBA
Hazards Forum	Risk to the Electricity Supply	www.hazardsforum.co.uk	December 2004
S&LPSG	Human Factors in the Control of Major Hazards	IChemE 1 Portland Place Contact John Munnings-Tomes Tel: 0207-357-2926 E-mail: john,munningstomes@marsh.com	20 January 2005
S&LPSG and Safety Forum	Safety Day for University Teachers	TBA	March 2005
S&LPSG	Fire Protection of Process plant and Storage	TBA	June 2005
S&LPSG with IMechE	Risk Based Inspection	TBA	September 2005
S&LPSG with SIESO	Security Risk Assessments	TBA	TBA
S&LPSG	Ignition of Flammables within Carbon Beds fitted to Venting Systems	TBA	November 2005
IChemE	7th World Congress of Chemical Engineering	Glasgow	10-14 July 2005
EFCE	International Loss Prevention Conference	Edinburgh	22 – 24 May 2007